TECHNO SERIES

A Textbook of

Engineering Physics

For the students of B.E., B.Tech., B.Arch

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A TEXTBOOK OF

ENGINEERING PHYSICS

Fourth Revised Edition : Sep 2016

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Dedicated to

our

Beloved Parents

Preface

Physics is one of the most important subject to all engineering students, where all most all the important elements of subject are covered. This book is written in accordance with the syllabus of various universities and autonomous engineering colleges as well and is useful for first year B.E/ B.Tech/B.Arch students. This book has been written in very simple and lucid way. Every effort has been made to make the treatments simple and comprehensive, so that even an average student also is able to follow independently. The difficult topics are explained with the help of clear diagrams. A number of problems are solved at the end of each chapter. The answers for unsolved problems are also noted. A number of objective questions with answers are also given at the end of each chapter. It is earnestly hoped that the book will be useful for all branches of first year engineering students and teachers as well.

This book has eighteen chapters. All topics are discussed completely and comprehensively. Each chapter begins with an introduction, which reviews all the fundamentals. The physical facts suggested by the mathematical expressions are clearly explained.

The first three chapters deals with the fundamentals of physical optics. In the first chapter the interference phenomena, interferometers and related contents are discussed. The second chapter deals with the diffraction phenomena and its applications. The polarization phenomena and its fundamentals, polarimeters are presented in chapter-3. Chapter-4 is the Lasers refer the basic principles and types of lasers. The detailed discussion of optical fibres and their classification are given in chapter-5. The sixth and seventh chapters are related to crystallography. The crystal structures and various types of lattices are analyzed in chapter-6. The crystal planes, miller indices and x-ray diffraction techniques are included in chapter-7. The basic concepts of quantum mechanics and the related contents are discussed in chapters 8 to 10. The chapter-8 deals with the de-Broglie's ideas on matter waves and fundamentals of quantum mechanics. In chapter-9 the general properties, classical and quantum free electron theories of metals are discussed. The Kronig-Penny model and formation of energy bands are presented in chapter-10. The fundamentals of magnetism and properties of magnetic materials are discussed in chapter-11. Chapter-12 refers to the basic principles of dielectric materials, polarization mechanisms, ferroelectricity and piezoelectricity. The fundamental laws of electromagnetism and Maxwell's equations are presented in the electromagnetic fields, chapter-13.The phenomenon of superconductivity, properties of super conductors and related theories are included in chapter-14. The detailed discussion of semiconductors, concentration of charge carriers of various semiconductors, light emitting diodes, photoconductors and solar cells are given in chapter-15. The understanding of sound absorption, reverberation time and its effect on building are discussed in the acoustics, chapter-16. An elaborative coverage of basic principles of ultrasonic waves and non-destructive testing using ultrasonics is made in Chapter-17. The properties, preparation and applications of nanomaterials are presented, in chapter-18.

The authors will appreciate any suggestions from teachers and students for the improvement of the book.

Dr. D. Thirupathi Naidu
M. Veeranjaneyulu

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